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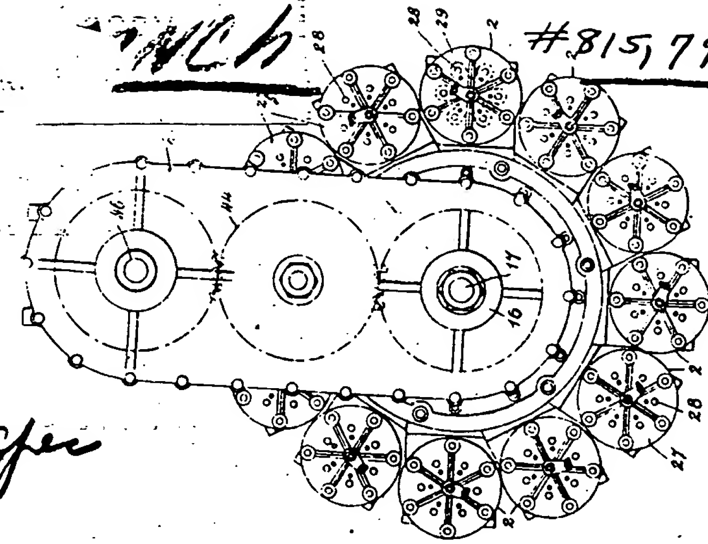

Fig. 2

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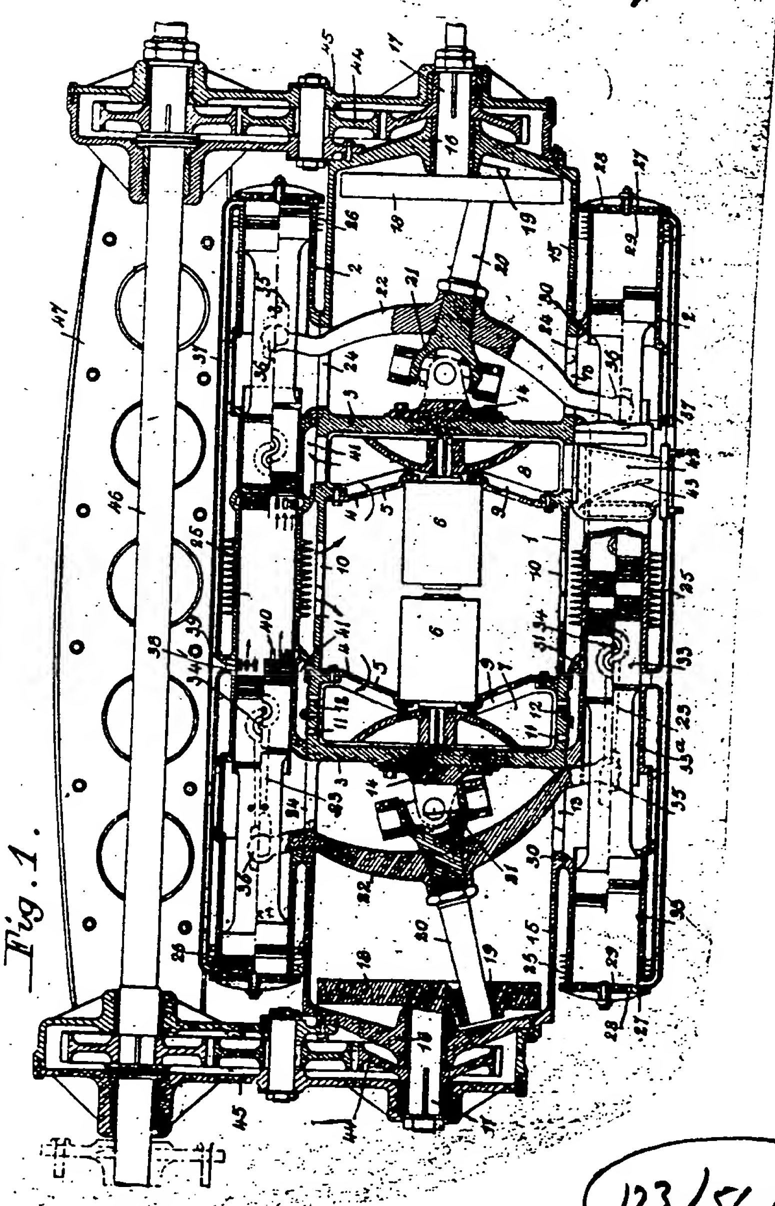

Fig. 1.

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RÉPUBLIQUE FRANÇAISE.

MINISTÈRE DU COMMERCE ET DE L'INDUSTRIE.

DIRECTION DE LA PROPRIÉTÉ INDUSTRIELLE.

BREVET D'INVENTION.

Gr. 5. — Cl. 8. N° 815.794

Moteur à deux temps à balayage induit.

M. Jules DHENAIN résidant en France (Seine-Inférieure).

Demandé le 31 décembre 1936, à 16h 29m, à Paris.
Délivré le 19 avril 1937. — Publié le 22 juillet 1937.

La présente invention concerne un moteur à combustion, fonctionnant à deux temps et possédant un balayage induit des gaz brûlés. Ce moteur se caractérise essentiellement en ce que les cylindres, disposés en barillet autour d'un carter central, comportent respectivement une chambre de travail, médiane, et deux chambres de compression, extrêmes ; ces chambres étant parcourues par des pistons couplés dont les fins de course sont décalées dans le temps. Chaque couple de pistons est attelée, au moyen d'une bielle, sur la rotule que porte un bras radian d'une pièce en forme d'étoile, cette pièce recevant un double mouvement d'oscillation ayant son centre sur l'axe de symétrie de cette dernière. Une autre caractéristique de ce moteur réside dans le fait que le carter central renferme deux groupes de ventilateurs qui sont commandés électriquement et dont la vitesse variable peut, en conséquence, être différente de celle de l'arbre du moteur à combustion. Ces ventilateurs, dont le refoulement dans les chambres de travail est contrôlé par les déplacements des pistons formant l'un des fonds mobiles de chacune de ces dernières, sont destinés à produire, en fin de course de travail moteur : d'une part, une chasse d'air dans les cylindres pour balayer les gaz brûlés, d'autre part, une action d'éjection, à l'échappement, afin de favoriser la circulation de ces gaz vers le collecteur correspondant et l'atmosphère.

Sur les dessins annexés et à titre d'exemple :

La fig. 1 est une coupe longitudinale verticale d'un moteur à deux temps à balayag induit, établi conformément à l'invention ;

La fig. 2 est une vue en bout du moteur.

Le moteur à deux temps et à combustion, qui fait l'objet de l'invention, se compose essentiellement d'un carter cylindrique 1, à axe horizontal, autour duquel sont répartis symétriquement les cylindres couplés 2. Ce carter cylindrique 1 comporte deux cloches 3 qui s'emboîtent par leurs bords libres, de manière à réaliser une chambre dans laquelle sont prévues deux cloisons tronconiques 4, percées de trous 5. Ces cloisons 4 centrent les carcasses de deux moteurs électriques 6, ayant même axe et dont les arbres d'induit entraînent des rotors de compresseurs d'air 7,8. Ces rotors sont logés dans les chambres 9 que forment entre elles les cloisons 4 et les fonds des deux cloches 3. L'air est aspiré au travers des ouvertures 10 de la paroi du carter et celles des cloisons 5 pour être ensuite refoulé, hors des chambres 9, par des ouvertures 11 que contrôlent des clapets battants 12.

Les fonds des cloches portent, extérieurement, une manchette circulaire 13 et une chape de cardan 14. Chaque manchette cir-

Prix du fascicule : 6 francs.

culaire 13 sert à centrer une autre cloche 15 dont le fond comporte un palier axial 16. Ce palier 16 supporte le tourillon 17 de l'arbre moteur, ce tourillon 17 étant solidaire d'un volant 18. Ce volant 18 est pourvu d'un coussinet 19 qui reçoit l'extrémité d'un arbre 20 faisant un angle déterminé avec l'axe de symétrie du carter et la ligne d'arbres (d'axe des tourillons). Cet arbre 20 se termine à son autre extrémité par une chape de cardan 21 qui se conjugue, par l'anneau 21', avec la chape correspondante 14 que porte le fond de la cloche centrale 3. De ce fait, l'axe de cet arbre décrit une surface conique dont le sommet est au centre de l'articulation universelle constituée par le joint de cardan. Sur cet arbre et participant à son mouvement est calée une étoile 22 dont le nombre des bras est égal à celui des cylindres. Ces bras réalisent la liaison entre l'embiellage 23 et le tourillon 17 correspondant de l'arbre moteur. Des ouvertures 24, pratiquées dans la paroi du carter 1, laissent passer ces bras et permettent les déplacements de ces derniers.

Chaque cylindre 2 est constitué par une enveloppe cylindrique possédant des ailettes de refroidissement 25, 26 en sa partie centrale (chambre de combustion) et en ses deux extrémités (chambre de compression pour l'air). Ces extrémités sont fermées par des fonds rapportés 27, dont les perforations 28 sont contrôlées par un clapet battant 29. L'axe de ces clapets peut être déplacé angulairement, au moyen d'une commande externe convenable, de manière à démasquer les perforations, ce qui réalise la décompression, lors de la mise en route par exemple, ou la mise hors fonctionnement du cylindre correspondant. Le cylindre 2 possède des embases 30 permettant sa fixation sur le carter central, ainsi que des chapelles 31, venues de fonderie ; ces chapelles étant destinées à réaliser les circuits air et gaz d'échappement. Chaque cylindre 2 possède deux chemises extrêmes 32 et une chemise intermédiaire 33 dont l'alésage est plus petit que celui des chemises d'extrémités ; l'espace réservé entre celle médiane et celles l'encadrant permettant des évolutions des bras de l'étoile qui dépendent des embiellages.

Dans chaqu ch mise externe 32 et dans la partie correspondante de celle médiane 33*a*, évolue un tandem de pistons 33, de diamètres différents ; ces pistons 33 étant couplés par des flasques latéraux. L'axe 34 de piston est porté par le piston moteur, de plus petit diamètre ; cet axe 34 reçoit une bielle 23 dont la tête est pourvue d'un coussinet formé de deux coquilles 35 à alésage sphérique. Dans cet alésage est monté et pivotée une rotule 36 que porte l'extrémité correspondante du bras de l'étoile 22 ; l'embiellage étant ainsi compris entre les flasques latéraux attelant les pistons correspondants moteur et compresseur d'air.

Les compresseurs appartenant à un même cylindre sont réunis par une canalisation méplate 37, laquelle est en outre en relation par un conduit semi-annulaire 38 avec des ouvertures 39, pratiquées dans la chemise centrale. D'autres ouvertures 40, légèrement décalées vers le milieu du moteur, mettent la chambre correspondante du cylindre en relation avec un collecteur qui reçoit, au travers du clapet battant 12, l'air que refoule le compresseur ou ventilateur rotatif. De cette manière, le piston moteur correspondant, en fin de temps moteur, démasque successivement les orifices 40, ce qui produit une injection d'air de balayage, puis les orifices 39 afin de permettre l'admission de l'air sous pression provenant des compresseurs extrêmes.

Le piston moteur opposé contrôle les lumières d'échappement qui débouchent dans un conduit à section progressivement croissante 42. La paroi oblique 43 de ce conduit réalise un autre conduit, de section progressivement décroissante, qui est en relation avec le refoulement du compresseur ou ventilateur rotatif. L'air dont la vitesse de translation est ainsi accrue dans son parcours le long de la cloison mitoyenne agit pour éjecter les gaz d'échappement. Puis cet air se mélange aux gaz chauds afin d'en abaisser la température au cours de leur évacuation à l'atmosphère.

Les étoiles qui reçoivent le mouvement des embiellages et qui entraînent en rotation les tourillons d l'arbre moteur sont calées relativement de manière que les pistons coopérants (pistons moteurs ou pistons compresseurs) n'attaquent pas, dans un même

cylindre, simultanément leurs positions de fin de course ; l'un des pistons commençant sa course inverse avant que le piston conjugué ait atteint sa position de fin de course. De cette manière, les lumières d'échappement sont masquées au moment où celles d'admission de l'air sous pression sont ouvertes. Inversement, les lumières pour réaliser l'introduction de l'air de balayage demeurent ouvertes en même temps que celles d'échappement et jusqu'à l'introduction de l'air sous pression que débitent les compresseurs d'extrémités.

Chacun des tronçons actionnent, par des renvois 44 que renferment des carters d'extrémité 45, un arbre creux 46, disposé parallèlement à l'axe longitudinal du carter central 1 et à ceux des cylindres 2. Cet arbre 46 est encadré par deux poutres 47 qui réunissent et entretoisent les carters d'extrémité 45, de manière à assurer l'indéformabilité du bâti.

Les injecteurs qui doivent déterminer l'introduction du combustible dans la chambre de travail que forment deux pistons moteurs opposés ne sont pas représentés, mais leur disposition se conçoit facilement et est analogue à celle en usage sur tous les moteurs à injection.

On peut apporter des modifications constructives aux dispositions ci-dessus décrites sans sortir du cadre de la présente invention.

RÉSUMÉ.

Moteur à combustion, à deux temps et à balayage induit, caractérisé par le fait que :

a. Les cylindres, disposés en barillet autour d'un carter central, comportent respectivement une chambre de travail, médiane, et deux chambres de compression, extrêmes, ces chambres étant parcourues par des pistons couplés dont les fins de course sont décalées dans le temps ;

b. Chaque couple de pistons dont les diamètres sont différents est attelée, au moyen d'une bielle, sur la rotule que porte un bras radian d'une pièce, en forme d'étoile ; cette pièce recevant un mouvement d'oscillation ayant son centre sur l'axe de symétrie de cette dernière ;

c. Le carter central renferme deux groupes de ventilateurs qui sont commandés électriquement et dont la vitesse variable peut, en conséquence, être différente de celle de l'arbre du moteur thermique ; ces ventilateurs, dont le refoulement dans les chambres de travail est contrôlé par les déplacements des pistons formant l'un des fonds mobiles de ces dernières, étant destinés à produire, en fin de course de travail moteur : d'une part, une chasse d'air dans les cylindres pour balayer les gaz brûlés, d'autre part, une action d'éjection, à l'échappement, afin de favoriser la circulation de ces gaz vers le collecteur correspondant et l'atmosphère.

Jules DHENAIN.

Par procuration :
H. Boettcher fils.

FRENCH REPUBLIC

MINISTRY OF TRADE AND INDUSTRY

DEPARTMENT OF INDUSTRIAL PROPERTY

PATENT.

Gr.5 – Cl. 8 No 815.794

Two-stroke engine with induced scavenging.

M. Jules DHENAIN residing in France (Seine-Inférieure).

Application dated December 31st 1936, at 4.29 p.m., in Paris.
Issued on April 19th 1937. – Published on July 22nd 1937.

This invention concerns a two-stroke combustion engine with induced scavenging of exhaust gases. This engine is essentially characterized by the fact that the cylinders, positioned in a barrel-shape around a central crankcase, are made up respectively of a median active chamber, and two pressure chambers on the ends. These chambers are filled with coupled pistons whose limits of travel are offset in time. Each couple of pistons is connected, with a rod, to the ball-and-socket joint supported by a radian arm from a star-shaped part. Said part is subjected to a double oscillating motion with its center on the axis of symmetry of the latter. Another characteristic of this engine is the fact that the central crankcase contains two groups of fans which are electrically controlled and whose variable speed, consequently, can be different from that of the combustion engine shaft. These fans, whose discharge into the active chambers is controlled by the shifting of the pistons forming one of the sliding bottoms of each one of said chambers, are designed to produce, in the limit of travel of the active engine: on one hand, air blast in the cylinders to scavenge the exhaust gases, and on the other hand, an ejection action, at the outlet, to help the circulation of these gases towards the corresponding manifold and the atmosphere.

On the attached drawings and as an example:

Fig. 1 is a vertical longitudinal section of a two-stroke engine with induced scavenging, created according to the invention:

Fig. 2 is a view of the engine from the end.

The two-stroke combustion engine that is the object of this invention, essentially includes a cylindrical crankcase 1, with an horizontal axis, around which the coupled cylinders 2 are symmetrically distributed. This cylindrical crankcase 1 is made up of two bells 3 interlocking on their free edges, thus creating a chamber in which are designed two truncated partitions 4, perforated to make holes 5. These partitions 4 center the carcasses of two electric engines 6, sharing the same axis, and whose rotor shafts drive some air compressor rotors 7, 8. These rotors are arranged in the chambers 9 formed between the partitions 4 and the bottom of the two bells 3. The air is sucked in through the openings

10 of the side wall of the crankcase and those of the partitions 5, and is then
the chambers 9, through openings 11, which are controlled by flapping valve
On the outside, the bottoms of the bells support a circular collar 13 and a carc

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{Page 2}

Each circular collar 13 is used to center another bell 15 whose bottom includes
bearing 16. This bearing 16 supports the journal 17 of the driving shaft, this jou
being integral with a flywheel 18. This flywheel 18 is equipped with a bearing j
holds the extremity of a shaft 20 making a determinate angle with the axis of sy
of the crankcase and the shafting system (of the axis of the journals). This shaft
at the other extremity with a cardan fork 21 paired using the ring 21' with the
corresponding fork joint 14 supported by the bottom of the central bell 3. On that
account, the axis of this shaft follows a conical surface whose vertex is in the cen
the universal joint created by the cardan joint. On this shaft and involved in its mc
star 22 is bound, the number of its arms being equal to that of the cylinders. These
form a link between the rodding 23 and the corresponding journal 17 of the drivin
Openings 24, made in the side wall of the crankcase 1, allow these arms to go thro
and thus to move.

Each cylinder 2 is made up of a cylindrical casing including cooling ribs 25, 26 in i
middle section (combustion chamber) and on its two extremities (compression spac
the air). These extremities are closed by bottom plugs 27, whose perforations 28 are
controlled by a flapping valve 29. The axis of these valves can be moved at an angle
using appropriate external control, so as to uncover the perforations, which will lead
the decompression, for example when the corresponding cylinder is activated or stop
The cylinder 2 has seatings 30 allowing it to be fixed onto the central crankshaft, as w
as main cases 31, obtained from casting. These cases are designed to create the circuit
for the air and exhaust gases. Each cylinder 2 includes two liners 32 at the extremities,
and an intermediary liner 33 whose bore is smaller than that of the end liners. The spac
allocated between the median one and the ones framing it allows the motion of the arm
of the star subject to the roddings.

In each external liner 32 and in the corresponding section of the median one 33a, moves
tandem of pistons 33, of different diameters: these pistons 33 being coupled by lateral
webs. The piston pin 34 is supported by the main piston, of smaller diameter. This pin 3
receives a rod 23 whose head is designed with a bearing created with two shells 35 with
spherical bore. In this bore, a ball-and-socket 36 is mounted and rotated, supported by th
corresponding extremity of the arm of the star 22. The rodding is thus included between
the lateral webs connecting the corresponding main piston and the air compressor piston.
The compressors belonging to a same cylinder are joined together by a flattened pipe 37,
which in addition, is linked by a half ring-shaped conduit 38, to openings 39, made in the
central liner. Other openings 40, slightly offset towards the middle of the engine, connect
the corresponding chamber of the cylinder to a manifold receiving through the flapping
valve 12 the air forced out of the compressor or rotating fan. This way, the corresponding
main piston, at the end of the working cycle, uncovers successively the holes 40, which

produces an injection of scavenging air, then the holes 39 to allow admission of under pressure air coming from the end compressors.
The opposite main piston controls the exhaust ports opening into a duct with a progressively increasing section 42. The oblique side wall 43 of this duct creates another conduit, with a progressively decreasing section, which is connected with the discharge of the compressor or rotating fan. The air, whose traveling speed is thus increased in its course along the dividing partition, helps to eject the exhaust gases. Then this air mixes with the hot gases to reduce the temperature in the course of their evacuation in the atmosphere.
The stars which are subjected to the motion of the roddings and which drive in rotation the journal of the driving shaft, are bound comparatively, so that the pistons working together (main pistons or compressor pistons) don't reach at the same time, in a same cylinder, their positions of limit of travel; one of the pistons starting to travel in the opposite direction before the connected piston has reached its limit of travel position.

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This way, the exhaust ports are covered when those for under-pressure air intake are open. Inversely, the ports to create the intake of the scavenging air remain open at the same time as those for the exhaust, and until the under-pressure air issued by the end compressors is introduced.
Each of the sections activate, with gears 44 contained by a crankcase 45, a hollow shaft 46, placed parallel to the longitudinal axis of the middle crankcase 1 and to those of the cylinders 2. This shaft 46 is framed by two girders 47, which join together and brace the end crankcases 45, thus ensuring a dimensionally stable engine frame.
The injectors, which must determine the admission of fuel in the active chambers created by two opposite main pistons, are not represented, but their layout can be understood easily and is similar to that used on all injection engines.
Structural alterations can be made to the layout described above, within the scope of this invention.

SUMMARY
Two-stroke combustion engine with induced scavenging, characterized by the fact that:
a. The cylinders, positioned in a barrel-shape around a central crankcase, are made up respectively of a median active chamber, and two pressure chambers on the ends; these chambers being filled with coupled pistons whose limits of travel are offset in time;
b. Each couple of pistons with different diameters, is connected, with a rod, to the ball-and-socket joint supported by a radian arm from a star-shaped part; said part is subjected to a double oscillating motion with its center on the axis of symmetry of the latter;
c. The central crankcase contains two groups of electrically controlled fans, whose variable speed can, consequently, be different from that of the combustion engine shaft; these fans, whose discharge into the active chambers is controlled by the shifting of the pistons forming one of the sliding bottoms of said chambers, are designed to produce, in the limit of travel of the active engine: on one hand, air blast in the cylinders to scavenge the exhaust gases, and on the other hand, an ejection

action at the outlet, to help the circulation of these gases towards the corresponding manifold and the atmosphere.

Jules DHENAIN.
By proxy:
H. BOETTCUER Junior.

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REPUBLIC OF FRANCE

MINISTRY OF COMMERCE AND INDUSTRY

PATENT DIVISION

PATENT OF INVENTION

Gr. 5 – Cl. 8 No. 815.794

Two-stroke cycle forced-scavenging engine.

Mr. Jules Dhenain, residing in France (Seine-Inférieure).

Application filed December 31, 1936, at 4:29 pm, in Paris.
Issued April 19, 1937. – Published July 22, 1937.

This invention relates to a two-stroke cycle combustion engine with scavenging forced by burnt gases. This engine is essentially characterized in that the cylinders, arranged in a barrel around a central crankcase, respectively comprise a central working space and two end compression chambers. Traveling through these chambers are dual pistons, the stroke-end timing of which is staggered. Each pair of pistons is coupled, by means of a rod, to the ball bushing borne by a one-piece, star-shaped radial arm. That part receives a dual oscillating motion centered on the axis of symmetry of the latter. Another characteristic of this engine is that the central crankcase encloses two fan sets, which are electrically driven, and whose variable speed may, consequently, be different from that of the crankshaft of the combustion engine. These fans, whose discharge into the working chambers is controlled by the travel of the pistons, forming one of the mobile bottoms of each of the latter, are designed to produce, at the end of the engine working stroke: firstly, an expulsion of air in the cylinders to scavenge the combustion gases and, secondly, an ejection action at the exhaust to promote circulation of said gases toward the corresponding manifold and the atmosphere.

In the attached drawings, as an example:

Fig. 1 is a vertical, longitudinal section of a two-stroke cycle forced-scavenging engine according to the invention;

Fig. 2 is an end view of the engine.

The two-stroke cycle combustion engine that is the object of the invention is essentially composed of a cylindrical crankcase 1 with a horizontal axis, around which the dual cylinders 2 are symmetrically distributed. This cylindrical crankcase 1 comprises two bells 3 that fit together at their free ends, forming a chamber in which there are two tapered partitions 4, pierced with holes 5. These partitions 4 center the housings of two electric motors 6, having the same axis and whose armature shafts drive the rotors of air compressors 7, 8. These rotors are lodged in chambers 9 that form partitions 4 between them and the bottoms of the two bells 3. Air is drawn in through the openings 10 in the wall of the crankcase and in the partitions 5, and then is discharged from the chambers 9 through openings 10 controlled by flapper valves 12.

Externally, the bottoms of the bells bear a circular collar 13 and a universal joint yoke 14. This circular collar 13 serves to center another bell 15 the bottom of which comprises an axial bearing 16. This bearing 16 supports the crankshaft journal 17, said journal 17 being integral with a flywheel 18. This flywheel 18 is equipped with a bushing 19 that receives the end of a shaft 20 forming a specific angle with the axis of symmetry of the crankcase and the line shafting (of the journal axis). At its other end, this shaft 20 ends in a universal joint yoke 21, which connects, via the ring 21', with the corresponding yoke 14 which bears the bottom of the central bell 3. Therefore, the axis of that shaft describes a conical surface the peak of which is at the center of the universal joint. Keyed on that shaft, and participating in its motion, is a star 22 with a number of arms equal to the number of cylinders. These arms form the connection between the connecting rod assembly 23 and the corresponding crankshaft journal 17. Openings 24 pierced in the wall of the crankcase 1 allow these arms to pass through and travel.

Each cylinder 2 is composed of one cylindrical housing with cooling fins 25, 26 at its center part (combustion chamber) and at its two ends (air compression chamber). These ends are closed by bottom plugs 27 with perforations 28 that are controlled by a flapper valve 29. The axis of the valves can be moved angularly, by means of an appropriate external command, so as to uncover the perforations, providing the decompression, during startup, for example, or shutdown of the corresponding cylinder. The cylinder 2 has sub-plates 30 for its attachment to the central crankcase, as well as cast valve cages 31, which are designed to form the air and exhaust gas circuits. Each cylinder 2 has two end sleeves 32 and one intermediate sleeve 33 the bore of which is smaller than that of the end sleeves. The reserved space between the median sleeve and external sleeves allows for movement of the star arms, which are dependent on the connecting rod assembly.

A pistons 33 of different diameters move in tandem in each external sleeve 32, said pistons 33 being coupled by side plates. The piston pin 34 is borne by the operating piston with a smaller diameter. This pin 34 receives a connecting rod 23 the head of which is equipped with a bushing formed by two shells 35 with a spherical bore. In that bore is mounted a pivoting ball socket 36, which bears the corresponding end of the star arm 22, the connector rod assembly thus being contained between the side plates coupling the corresponding pistons and air compressor.

The compressors belonging to a single cylinder are joined by a flat-faced conduit 37, which is also in contact with a semi-annular conduit 38 with opening 39 pierced in the central sleeve. Other openings 40, slightly offset toward the middle of the motor, connect the corresponding cylinder chamber with a manifold that receives, through the swing type valve 12, the air discharged by the compressor or rotary fan. In this manner, the corresponding operating piston, at the end of the power stroke, successively uncovers the openings 40, which produces an injection of scavenging air, and then the openings 39, in order to allow an intake of pressurized air from the end compressors.

The opposite operating piston controls the exhaust ports, which discharge into a conduit 42 with a progressively increasing section. The oblique wall 43 of this conduit forms another conduit, with a progressively decreasing section, which is connected to the discharge of the compressor or rotary fan. The air, the travel speed of which is thus increased as it passes along the dividing wall, ejects the exhaust gases. Then, this air

mixes with the hot gases to decrease their temperature as they are evacuated into the atmosphere.

The stars that receive the motion of the connecting rod assembly and that rotationally drive the crankshaft journals, are relatively wedged such that the cooperating pistons (operating pistons or compressor pistons) do not attack their stroke-end positions simultaneously in a single cylinder. One of the pistons begins its reverse stroke before the joined piston reaches its stroke-end position. In that manner, the exhaust ports are covered at the moment when the air intake ports are open. Conversely, in order to admit the scavenging air, the ports remain open at the same time as the exhaust ports, until admitting the pressurized air discharged by the end compressors.

By means of countershafts 44 in the end casings 45, each of the segments activates a hollow shaft 46, arranged parallel to the longitudinal axis of the central crankcase 1 and to those of the cylinders 2. This shaft 46 is framed by two beams 47, which join and brace the end casings 45, ensuring that the structure retains its shape.

The injectors that must determine the admission of fuel into the working chamber formed by two opposing operating pistons are not illustrated, but their arrangement may be easily imagined and is similar to the one used in all injection engines.

Constructive modifications may be made to the aforesaid arrangements within the framework of the invention.

ABSTRACT

Two-stroke cycle forced-scavenging engine, characterized in that:

a. The cylinders arranged in a barrel around a central crankcase, respectively comprise a central working chamber and two end compression chambers. Traveling through these chambers are dual pistons the stroke-end timing of which is staggered.

b. Each pair of pistons is coupled, by means of a rod, to the ball bushing borne by a one-piece, star-shaped radial arm. That part receives a dual oscillating motion centered on the axis of symmetry of the latter.

c. The central crankcase encloses two fan sets, which are electrically driven, and whose variable speed may, consequently, be different from that of the crankshaft of the heat engine. These fans, whose discharge into the working chambers is controlled by the travel of the pistons, forming one of the mobile bottoms of each of the latter, are designed to produce, at the end of the engine working stroke: firstly, an expulsion of air in the cylinders to scavenge the combustion gases and, secondly, an ejection action at the exhaust to promote circulation of said gases toward the corresponding manifold and the atmosphere.

Jules Dhenain
By proxy:
H. Boettguer, Sons.